



US Army Corps
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Walla Walla District



United States
Environmental Protection Agency
Region 10

DREDGED MATERIAL MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT

McNary Reservoir and Lower Snake River Reservoirs

APPENDIX M Monitoring Program

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<p>This final Dredged Material Management Plan/Environmental Impact Statement (DMMP/EIS) presents the Corps of Engineers' programmatic plan for maintenance of the authorized navigation channel and certain publicly owned facilities in the lower Snake River reservoirs between Lewiston, Idaho and the Columbia River, and McNary reservoir on the Columbia River for 20 years; for management of dredged material from these reservoirs; and for maintenance of flow conveyance capacity at the most upstream extent of the Lower Granite reservoir for the remaining economic life of the dam and reservoir project (to year 2074). The Corps, along with the U.S. Environmental Protection Agency, analyzed four alternatives for this Final DMMP/EIS: Alternative 1 - No Action (No Change) - Maintenance Dredging With In-Water Disposal; Alternative 2 - Maintenance Dredging With In-Water Disposal to Create Fish Habitat and a 3-Foot Levee Raise; Alternative 3 - Maintenance Dredging With Upland Disposal and a 3-Foot Levee Raise; and Alternative 4 - Maintenance Dredging With Beneficial Use of Dredged Material and a 3-Foot Levee Raise (Recommended Plan/Preferred Alternative).</p>			
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**DREDGED MATERIAL MANAGEMENT PLAN
AND ENVIRONMENTAL IMPACT STATEMENT
McNARY RESERVOIR AND LOWER SNAKE RIVER RESERVOIRS**

**APPENDIX M
MONITORING PROGRAM**

**U.S. Army Corps of Engineers
Walla Walla District
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Walla Walla, WA 99362**

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1.0 INTRODUCTION

This monitoring program has been developed to outline general procedures associated with proposed monitoring activities documented in the Lower Snake River and McNary Reservoir Dredged Material Management Plan/Environmental Impact Statement (DMMP/EIS). The program provides a mechanism for integration of a multidisciplinary team and established protocols to successfully achieve project goals and objectives.

1.1 Purpose and Need

The overall purpose of the monitoring program is to provide a framework that will ensure compliance with applicable environmental laws and regulations; assess the effectiveness of beneficial uses of dredged material; and provide feedback to the Corps to improve the long-term dredged material management program. The monitoring program is also intended to:

- Provide an effective way to document activities and decisions and to communicate the data collection design to others.
- Enable data users and relevant technical experts to participate.
- Clarify vague objectives and limit the number of decisions that will be made.
- Focus data collection operations so that they are resource-effective.
- Define decision performance requirements that are appropriate for the intended use of the data.
- Facilitate a working relationship with regulators and stakeholders that will aid in timely review and increased credibility.

1.2 Project Background and Location

The U.S. Army Corps of Engineers' Walla Walla District (Corps) is responsible for the maintenance of the authorized navigation channel in the lower Snake River reservoirs between Lewiston, Idaho, and the Columbia River, and McNary Lock and Dam (McNary) reservoir on the Columbia River. As part of channel maintenance, the Corps must address dredged material from these reservoirs. Plates 1-18 in the DMMP/EIS show the study area.

The Corps is also responsible for maintenance of a number of public facilities within the reservoirs including recreational boat basins, irrigation intakes for the wildlife habitat management units (HMUs), and public recreation sites. The Corps must also maintain the flow conveyance capacity at the most upstream extent of the Lower Granite Lock and Dam (Lower Granite) reservoir for the remaining economic life of the project (to year 2074).

The Corps has developed a 20-year programmatic approach to channel maintenance and dredged material management, as documented in the DMMP/EIS. In the course of program development, the Corps realized the need to integrate regulatory requirements for monitoring into the overall planning process.

2.0 MONITORING REQUIREMENTS

The intent of the Monitoring Program is to foster communication, feedback, and integration of the individual monitoring requirements proposed in the DMMP/EIS. The specific *monitoring activities* proposed in the DMMP/EIS are:

- Assessing the effects of dredging and dredged material management on water quality and aquatic resources consistent with the requirements of the National Marine Fisheries (NMFS) Service's Biological Opinion.
- Evaluating the beneficial uses of dredged material to determine if they are meeting their intended goals.
- Evaluating the long-term stability of in-water habitat creation or other beneficial use of dredged material.
- Evaluate dredging activities to avoid adverse impacts on cultural resources.
- Providing information to the Corps and Local Sediment Management Group (LSMG) that will facilitate on-going evaluation of dredged materials management and environmental resources, consistent with the provisions of the DMMP/EIS.

This monitoring program provides general guidance to achieve the above objectives. This program also incorporates, by reference, the standards and guidance that will dictate the activities and analyses that will occur as this program is implemented. Specific monitoring requirements and protocols are provided in the NMFS Biological Opinion for the project, Dredged Material Evaluation Framework, the 404(b)(1) evaluation, and Section 106 Cultural Resources Consultation. Although these documents are incorporated by reference, a brief description of these programs and requirements follows.

2.1 Dredged Material Evaluation Framework

The Corps will develop a comprehensive evaluation framework that will govern the sampling, sediment testing, and disposal guidelines for dredged material. This document will focus on evaluating the suitability of using dredged material for in-water disposal. This document will be based on applicable National guidance documents such as *Evaluation of Dredged Material Proposed for Discharge in the Waters of the United States- Testing Manual*, February 1998, referred to as the "Inland Testing Manual" (ITM).

This framework will provide a series of sediment sampling tiers from I though IV that will aid in determining the level of sediment chemical testing that is needed, if any. The framework also provides guidelines for the development of a Sampling and Analysis Plan (SAP), should one be needed.

Since there are currently no uniform freshwater sediment quality criteria that provide a definitive numerical standard for evaluation of dredged material, the Corps is developing a Mid-Columbia and Lower Snake River Region Sediment Testing Framework. An outline for the proposed framework is included in the DMMP/EIS in Appendix J. In the interim, the Dredged Material Evaluation Framework: Lower Columbia River Management Area will be used by the Corps to evaluate the potential water quality impacts of dredging, dredged material management, and the suitability of dredged material for in-water disposal. The specific procedures in the Lower

Columbia Framework will be used and evaluated for their applicability for adoption as part of the Mid-Columbia and Lower Snake River framework.

2.2 NMFS Biological Opinion

The National Marine Fisheries Service (NMFS) issued its final Biological Opinion (BO), entitled "The Biological Opinion and Essential Fish Habitat Consultation on the Dredged Material Management Plan for the McNary Reservoir and Lower Snake River Reservoirs" in response to the Corps' Biological Assessment. The BO is the product of an Endangered Species Act (ESA) Section 7 formal consultation between NMFS and the Corps. The consultation covers the proposed action as described in the DMMP/EIS; it was initiated because the proposed action could potentially affect anadromous fish species listed under the ESA.

The BO contains Reasonable and Prudent measures that include monitoring to ensure that proposed dredging and dredged material management activities do not jeopardize endangered salmonid stocks. This includes monitoring that will occur during the proposed 2002-2003 dredging season as well as actions that will be taken over the 20-year period covered by the DMMP/EIS.

Monitoring during 2002-2003 will include:

- Water quality monitoring during dredging and disposal of materials, including turbidity, ammonia, temperature, and pH.
- Redd distribution surveys prior to dredging near lock approaches of the lower Snake River dams.
- Determination of the spatial and temporal distributions of juvenile salmonids in the proposed dredging and disposal areas.

For the remainder of the 20-year plan, the Corps will consult with NMFS on future dredging operations annually (or as often as necessary). The Corps will not begin individual dredging projects until consulting with NMFS on specific project elements. During the next 20 years, the Corps has committed to the following long-term salmonid-related monitoring projects:

- The study of habitat creation through in-water dredged material disposal.
- The spatial and temporal distributions of salmonids in backwater habitats that are anticipated future dredging locations.
- Sediment sampling and contaminant analysis in proposed dredging areas where it has not yet been conducted.

2.3 401 Certification

The Corps will request a CWA Section 401 Certification from the state(s) where dredging and disposal are scheduled. The individual 401 Certifications will be issued based on the information provided in the 404(b)(1) evaluations prepared by the Corps for each suite of dredging actions proposed to be accomplished during a given year. The 404(b)(1) Evaluations will be similar to the one prepared for the 2002-2003 dredging year (Appendix I of the DMMP/EIS).

The purpose of the 404(b)(1) Evaluation is to evaluate the potential impacts to the chemical, physical, and biological integrity of waters of the United States from discharges of dredged or fill material. As a condition of 401 Certification issuance, the individual states may include water quality monitoring of dredging activities. The Corps will incorporate any appropriate conditions into this Monitoring Program.

2.4 Section 106 Consultation

The Corps conducted National Historic Preservation Act Section 106 consultation with State Historic Preservation Officers and Tribal Historic Preservation Officers to evaluate effects of proposed actions on cultural resources. In general, the Corps intends to avoid known cultural resources, thus avoiding impacts. Consultation with SHPOs and THPOs may result in specific conditions to monitor dredging and dredged material management activities.

3.0 PROGRAM SUMMARY

As described previously, the intent of the Monitoring Program is to combine the regulatory monitoring requirements, and to provide a framework for program evaluation and feedback. This section outlines the process for establishing objectives, undertaking monitoring activities, and evaluating the resulting data. The Corps' technical specialists will be responsible for coordinating monitoring and evaluation activities. Where appropriate, the LSMG, and federal, state, and local agencies and Tribes may be involved in coordination of monitoring activities.

This Monitoring Program must address five media or “data categories,” as follows:

- Dredged material (sediment) testing.
- Water quality testing during dredging and disposal.
- Physical stability or movement of the disposed material (e.g., sediment migration).
- Biological processes (e.g., fish production) and habitat quality.
- Cultural resources.

Each of these categories requires different levels of data collection. For example, the dredged material testing involves a pre-determined, quantifiable analysis that is generally accepted by the regulatory community. On the other hand, monitoring biological processes, such as juvenile fish recruitment at areas of created habitat may need be more flexible.

This Monitoring Program process presents a series of “steps” that would apply to each dredging project regardless of the data category being monitored (e.g., water quality, biological). The results of each project can be evaluated and fed back into the next process, creating an iterative process. Although each dredging project will be distinct, there will be similarities in data collection, beneficial use designations, and potential effects of material movement. These steps are described in detail in Section 3.0, but are briefly outlined below and illustrated in Figure M-1.

Step 1. Define the Project and Identify Objectives

Define the physical project boundaries and project objectives, that is, identify where and how much material will be dredged, and determine the disposal alternatives.

Project objectives (e.g., create rearing habitat for juvenile salmonids) should be outlined as well.

Step 2. Set Goals and Define Criteria

Specify goals and evaluation criteria for each of data categories.

Step 3. Develop Monitoring Plan

Identify the data parameters to be collected and set forth a protocol for data management and evaluations based on the goals and criteria defined in Step 2.

Step 4. Implement Plan

Undertake monitoring activities. Track schedule, budget, collection responsibility, and database management.

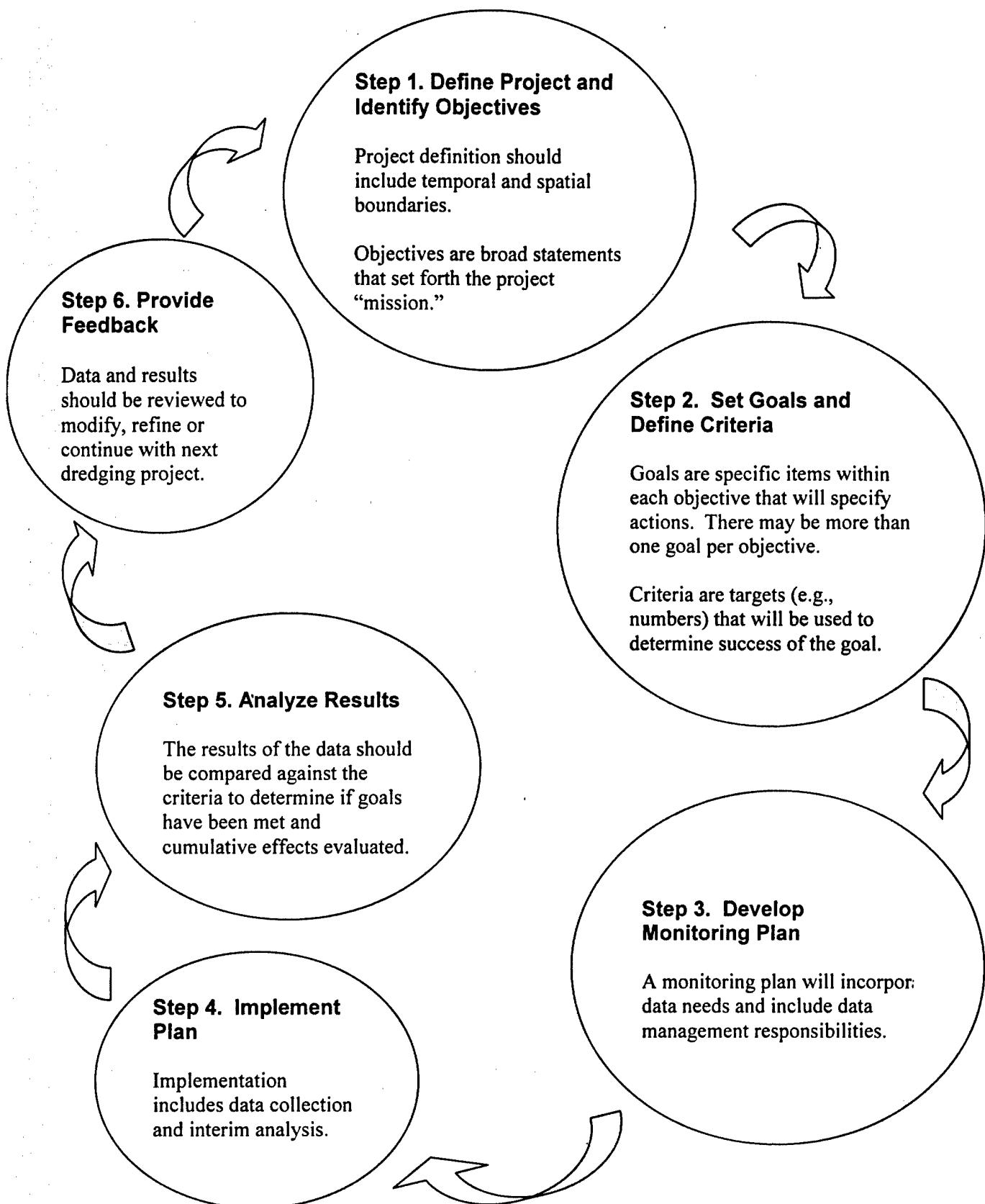
Step 5. Analyze Results

Analyze results to determine whether the criteria and goals were met.

Step 6. Provide Feedback

Provide feedback to technical specialists and program managers and, if needed, regulatory agencies to communicate the intended purpose of the monitoring, the results (including the goal-setting), and applicability to future dredging projects.

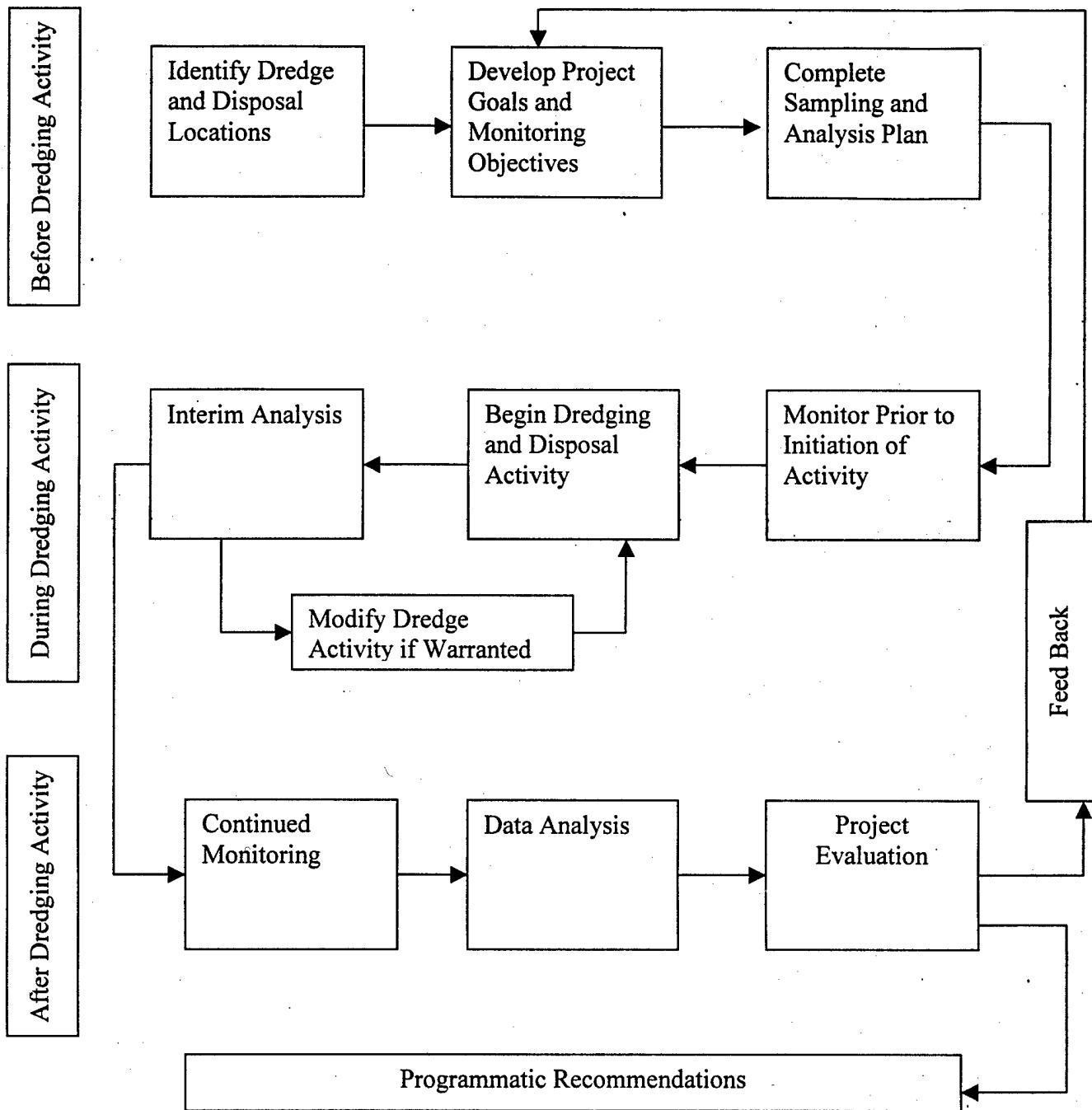
Figure M-1. Monitoring Program Steps



4.0 MONITORING PROGRAM

The details of the Monitoring Program, while following the basic steps above, have been divided into three distinct timelines. These are *before*, *during*, and *after* dredging. These steps are illustrated in Figure M-2 and are presented in detail below.

Figure M-2 Monitoring Program Flow Chart



4.1 Before Dredging

Prior to the initiation of dredging, it is important to identify project goals and the baseline from which monitoring data will be evaluated. At this point, the Corps will identify a team responsible for monitoring activities. The Corps will determine the schedule and budget for monitoring and, if resources are limited, will prioritize the monitoring activities.

4.1.1 Identify Dredge and Disposal Locations

The physical boundaries of the project should be set (e.g., how much material should be removed and from where). At this point, the team can either perform the dredged material sampling in accordance with the Evaluation Framework or identify alternative disposal locations (i.e., upland) based on the results of this testing. The disposal locations will also be identified.

4.1.2 Determine Project Objectives and Goals

Project objectives should be developed for each of the five data categories. These objectives can range from meeting regulatory requirements to assessing the stability and/or environmental benefits of a beneficial use of dredged material. These objectives may be relatively straightforward, such as meeting the requirements outlined in the framework or criteria in state water quality standards. Conversely, other objectives may be to improve salmonid rearing habitat. In these cases, input from the regulatory agencies may need to be considered during the development of project objectives. Some regulatory agencies, such as NMFS, will require consultation prior to any dredging activity.

Goals will then stem from the objectives. There can be several goals for each objective. For example, if the objective is to improve juvenile salmonid habitat, then the goals could be:

- Recruit a certain density of macroinvertebrate species (food) that will support corresponding number of fish
- Provide instream habitat that will encourage juvenile salmonid use of area
- Minimize mortality of juvenile salmonids due to predation
- Increase the riparian structure

4.1.3 Set Monitoring Parameters and Criteria

Monitoring parameters and success criteria should then be developed based on the project goals. The monitoring parameters should be selected so that they can “answer” the goal statement. This step should focus on identifying the information that would be needed to determine if rearing habitat is improved.

Success criteria (that is, criteria that define goals have been successfully met) should also be developed at this time. Defining these criteria will also help determine the data parameters and collection frequencies. Some parameters may require one sampling event, while others may have to be sampled monthly for five years to obtain enough data for credible analysis.

For macroinvertebrates, the criteria could be considered successful if desired densities of various species are reached (e.g., X individuals/square meter), or where there is an increase in number over the pre-construction condition.

For some monitored parameters, statistical evaluation based on set criteria (e.g., water quality standards) is possible. For subjective parameters, descriptive measures can be used to provide a rating of parameters (e.g., that meet, do not meet, or exceed expectations).

4.1.4 Develop a Sampling and Analysis Plan

A Sampling and Analysis Plan (SAP) should be developed that details procedures for sampling and analysis by parameter for both dredging and dredged material disposal locations, based upon the criteria defined in 3.1.2. The type, frequency, and duration of sampling should be outlined in the plan as well as analysis procedures. The SAP should include a budget, cost estimate for data collection, and schedule. The SAP should also outline the procedures for data Quality Assurance and Control (QA/QC) as well as data management. Data management will be a crucial component for effective analysis.

4.2 During Dredging Activity

During dredging activities, the primary action will be the implementation of the monitoring activities.

4.2.1 Monitoring

During monitoring, the Corps' project manager and technical specialists should systematically check the items identified in the SAP to ensure that they are being completed, including data QA/QC and database management.

4.2.2 Interim Analysis and Dredge Activity Modification

Where possible, data gathered during dredging activities (e.g., water quality) should be evaluated to determine if goals (e.g., water quality standards) are being met. These data should be completed at both the dredging and disposal locations. If needed, dredging or disposal activities may need to be modified as needed to meet target goals. Sampling should confirm that these goals are met.

4.3 After Dredging Activity

After dredging activity has ceased, the focus of the process will be on completing data collection and evaluating the monitoring data. This could continue for several years or dredging cycles depending on the goals and criteria set forth before dredging began.

4.3.1 Continued Monitoring

While some data collection may end after the completion of disposal activities, some monitoring will continue. Each data category should include a timeline for sampling and analysis. In some

cases, this monitoring could last from one additional year to ten years, depending on the goals and criteria. For example, collecting data on the evaluation of riparian structure may take several years, while collecting data pertaining to juvenile salmonid use of the area may be sufficient after one or two years.

There should also be a method in place that will allow data collection to end prior to scheduled completion, if the success criteria have been met. For example, it may have been estimated that it would take five years to establish habitat to support rearing juvenile salmonids, but after three years, data may show that habitat is stabilized and juvenile salmonids are indeed using the area consistently.

4.3.2 Data Analysis

The data should be evaluated in accordance with the SAP, and the procedure for data evaluation (i.e., statistical analysis) predetermined. For each monitoring parameter, a determination should be made as to whether the success criteria were met. If the data are not sufficient or are too varied to make this determination, this should be acknowledged and recommendations for future collection presented.

5.0 PROJECT EVALUATION

The most important component of the Monitoring Program is the project evaluation and feedback. For each objective, the evaluation should determine if the project was successful, not successful, or inconclusive. This information should be relayed to other technical staff in the Corps that are responsible for dredged material management.

The data, criteria, and goals should be evaluated for applicability to other dredging projects. For each set of data collected, an analysis should determine the results that would be applicable to other projects. For example, if macroinvertebrate recruitment was found to be successful, the next dredging project could use similarly sized substrate, water depth, velocity, and organic materials. If the goal was not a success, the process and results should be evaluated and recommendations made for future projects. This information could be used to modify the project description, location, or methods of data collection for the next dredging effort.